Operating Experience Weekly Summary 99-10

March 5 - March 11, 1999

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EVENTS

1. WORKER RECEIVES ELECTRICAL SHOCK

On February 25, 1999, at the Hanford Waste Encapsulation and Storage Facility, an operator received an electrical shock while removing a sticker from the inside of an electrical panel. He was shocked when he touched the contacts of an energized, 120-V indicator light. Physicians evaluated the operator and determined that he could return to work without restrictions. The operator was not qualified to work near exposed, energized circuits and could have been seriously injured. (ORPS Report RL--PHMC-WESF-1999-0005)

The shock caused the operator to involuntarily grasp the energized fixture, but he was able to push himself free. Investigators verified that there were exposed, energized 110-V connectors on the back of the panel and ordered workers to place a nonconductive plastic sheet over the exposed circuits. They determined that the exposed electrical terminals had been allowed by OSHA because they were guarded by an enclosure that was intended to be accessed only by qualified persons. They further determined that the operator had recently completed medium-risk electrical worker training but that this training did not qualify him to gain access to the inside of the energized electrical panel. Investigators determined that if the operator was qualified, he would have recognized the hazard of open electrical terminals and assumed them to be energized until they were verified as being de-energized and locked and tagged out of service. No one attempted to place a lockout/tagout on the energized circuits or perform a zero-energy check. Figure 1-1 shows the front of the panel and Figure 1-2 shows the rear of the panel, the sticker, and the exposed terminals.

Figure 1-1. Front of Panel

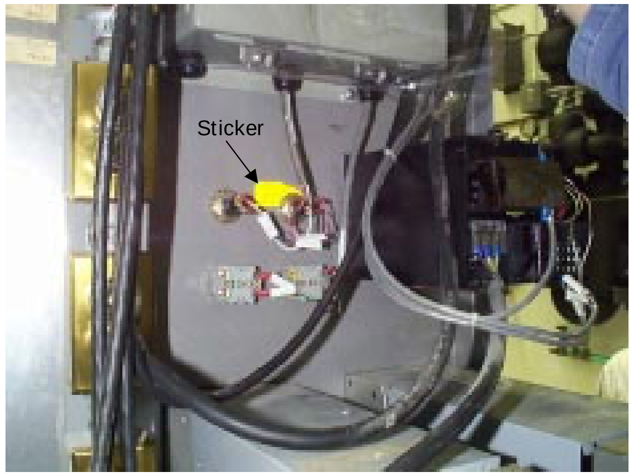

Figure 1-2. Rear of Panel

NFS has reported similar events where workers were not qualified for the task that their supervisors assigned them to complete. Following are some examples.

- Weekly Summary 98-30 reported that boiler inspectors at the Idaho National Engineering and Environmental Laboratory discovered that a subcontractor that installed a new feed-water chemical injection system was not qualified to perform alterations on boiler systems. The subcontractor welded piping inside the boiler external piping envelope, which requires specific certification. (ORPS Report ID--LITC-LANDLORD-1998-0024)

- On December 5, 1996, at the Savannah River In-Tank Precipitation Facility, an electrical and instrumentation mechanic lifted and taped an incorrect lead while installing a lockout. A facility operator installed a tag on the lead and signed the lockout. Another operator verified and initialed the lockout step as being correct. A construction worker conducting zero-energy checks recognized that the incorrect lead had been lifted, tagged, and taped. Critique members determined that the independent verification process did not work because the second operator was not qualified to identify the correct tag point. (ORPS Report SR--WSRC-ITP-1996-0042)

These events reinforce the need to maintain controls on personnel qualification and develop solid linkages between qualifications and task assignments. Facility managers should review their training program records and controls to ensure that staff are qualified for the tasks to which they are assigned. Employees should also accept the responsibility for meeting qualification requirements.

DOE O 5480.20A, *Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities,* states that the purpose of the Order is to assure that all persons are qualified to carry out their assigned responsibilities. Requirements for initial and continuing training can be found in chapters I.7.c and I.7.d.

KEYWORDS: lockout and tagout, shock, training and qualifications

FUNCTIONAL AREAS: Industrial Safety, Training and Qualification

2. SUBCONTRACTOR FALLS THROUGH ROOF

On March 9, 1999, at the Oak Ridge East Tennessee Technology Park, a subcontractor fell through the roof of a one-story office structure located within a larger building. Oak Ridge medical professionals evaluated the worker and determined that he had abrasions and contusions but no broken bones. The facility manager suspended work over the office area until the above-ground-floor-level work plan can be reviewed and revised. This event is significant because the proper use of fall protection equipment can prevent personnel injuries and, possibly, fatalities. (ORPS Report ORO--BJC-K25GENLAN-1999-0004)

Investigators determined that the subcontractor was performing decontamination work on the open-joist roof of the office area. A radiological control technician surveyed the subcontractor before he was transported off the site and determined that he was not contaminated. As the subcontractor stood on a temporary piece of plywood lying across the joists, it slid and allowed him to fall between the joists and through Sheetrock™ fastened to the bottom of the joists. He landed on a table approximately 7 feet below, the table legs buckled, and the subcontractor slid to the floor. The plywood was not fastened in place on the roof of the office, and the subcontractor was not using any fall protection.

NFS has reported numerous other fall protection violations and fall-related injuries in the Weekly Summary. Following are some examples.

- Weekly Summary 97-44 reported that a subcontractor pipe fitter at the Oak Ridge National Laboratory fell through a roof opening of a tank vault building and landed on wooden scaffold decking 15 feet below. As the pipe fitter walked on a temporary plywood cover for a hatch into the tank vault, it dislodged, allowing the pipe fitter to fall. (ORPS Report ORO--LMES-X10CM-1997-0005)

- Weekly Summary 97-42 reported that a safety inspector at the Los Alamos National Laboratory initiated a stop-work order to a roofing subcontractor because of repeated fall protection violations. The safety inspector observed a subcontractor safety monitor assisting in roofing activities. OSHA regulations and contractor procedures required using a dedicated safety monitor who had no other responsibilities. (ORPS Report ALO-LA-LANL-LANL-1997-0002)

- Weekly Summary 96-29 reported that a subcontractor employee escaped serious injury when his retractable lanyard activated as he fell 65 feet through the roof of a four-story building that was being demolished at Fernald. The employee lost his footing and fell forward onto an area where a layer of roof panels had been removed. His weight caused the remaining panel to give way, and he fell. The employee was wearing a full-body safety harness with a retractable lanyard that tightened and stopped his fall after 6 to 8 feet. (ORPS Report OH-FN-FERM-FEMP-1996-0038)

These events underscore the need for adequate implementation of fall protection safety requirements. DOE facility managers should review the following requirements and procedures and ensure that employees are familiar with both site and OSHA requirements on fall protection when they are working on roofs, towers, stacks, and buildings.

OSHA regulation 29 CFR 1926, *Safety and Health Regulations for Construction*, Subpart M, "Fall Protection" (1926.500 to 1926.503), governs the use of fall protection when working 10 feet or more above the next lower level. Section 1926.501, “Duty to Have Fall Protection,” requires employers, except for those involved in steel erection, to determine that walking/working surfaces have the strength and structural integrity to safely support them. The regulation further states that each employee on a walking/working surface with an unprotected side or edge that is 6 feet or more above a lower level must be protected from falling by a guardrail system, a safety net system, or a personal fall arrest system.

Section 29 CFR 1926.502, “Fall Protection Systems Criteria and Practices,” requires employers to provide and install fall protection systems for employees and to comply with all other pertinent requirements before employees begin the work that necessitates fall protection.

OSHA states: “Each year, on average, between 150 and 200 workers are killed and more than 100,000 are injured as a result of falls at construction sites. OSHA recognizes that accidents involving falls are generally complex events frequently involving a variety of factors. Consequently the standard for fall protection deals with both the human and equipment-related issues in protecting workers from fall hazards.” OSHA Publication 3146, *Fall Protection in Construction,* discusses general fall protection concepts; 29 CFR 1926, Subpart M; and fall protection systems including (1) covers, (2) guardrail systems, (3) personal fall arrest systems, and (4) safety net systems. The publication also addresses a mandatory training program for employees who might be exposed to fall hazards, including ways to recognize and minimize the hazards.

NIOSH Alert, Publication No. 90-100, *Preventing Worker Deaths and Injuries from Falls Through Skylights and Roof Openings,* discusses occupational fatalities caused by falls and describes eight events in which employees and workers violated applicable OSHA regulations. In each event, a fatality occurred.

Both the OSHA and NIOSH publications can be obtained by accessing http://www.osha-slc.gov/SLTC/fallprotection/index.html. To obtain a copy of the OSHA publication, contact the local regional or area OSHA office (listed in the telephone directory under U.S. Department of Labor) or write to OSHA Publications Office, 200 Constitution Ave., NW, Room N-3101, Washington, D.C. 20210. OSHA regulations can also be found at http://www.osha-slc.gov/.

KEYWORDS: construction, fall protection, roof, injury

FUNCTIONAL AREAS: Construction, Industrial Safety

3. CRAFT PERSONNEL UNKNOWINGLY REMOVE ASBESTOS INSULATION

On February 9, 1999, at the Pantex Plant, craft personnel removed some insulation that contained asbestos from a chilled water circulating pump in order to read the nomenclature plate on the pump. They assumed the insulation was free of asbestos-containing material (ACM). Industrial hygiene personnel later sampled the insulation and determined that it did contain asbestos. The craft personnel were not wearing appropriate respirators or personal protective equipment, and there was no work plan for removing asbestos. Although no personnel injuries or adverse effects on the environment resulted from this event, it is significant because failure to identify the asbestos before removal exposed the craft personnel to a known carcinogen. (ORPS Report ALO-AO-MHSM-PANTEX-1999-0018)

The craft personnel were to repair a leaking seal on a hot water circulating pump in an equipment room. After evaluation, they determined the pump could not be repaired. They attempted to read the nomenclature plate on the pump to obtain information to order a new one, but the plate was not readable. The craft personnel decided to get the needed information off a chilled water circulating pump, which was an identical pump. To read the second plate, they had to remove some insulation. On March 1, the facility manager noticed pieces of insulation on the floor of the equipment room during his walk-down of the facility. He directed industrial hygiene personnel to sample the insulation, and they determined it contained asbestos. Industrial hygiene personnel closed the equipment room and posted "DO NOT ENTER" signs. Maintenance Work Control Department personnel prepared a work order for cleanup of the insulation.

Investigators determined that the craft person who removed the insulation was a volunteer on an asbestos abatement crew and was appropriately trained. The insulation for the pump with the leaking seal was labeled as not containing asbestos, which had been verified by industrial hygiene personnel. However, the insulation on the piping for the chilled water circulating pump was labeled as containing asbestos, and this labeling was within 3 feet of the pump.

NFS has reported other events involving asbestos in the Weekly Summary. Some examples follow.

- Weekly Summary 98-39 reported that workers performing asbestos abatement at the East Tennessee Technology Park failed to isolate their work area to prevent other facility personnel from entering it while they cleaned up debris from a fallen pipe, including asbestos insulation material. The workers also did not reevaluate the job conditions to ensure that their radiation work permit allowed them to perform the cleanup work with the personal protective equipment they were wearing to perform the abatement work. (ORPS Report ORO--BNFL-K33-1998-0008)

- Weekly Summary 97-50 reported that craft personnel at the Fernald Environmental Management Project spread ACM through part of an office building as they carried pieces of a heating, ventilating, and air conditioning unit that they had just removed. Because they had failed to have industrial hygiene personnel verify that the unit was free of ACM, they did not recognize that debris left in the work area included ACM. A porter who had recently attended an asbestos awareness training class went to vacuum the area and suspected the debris contained ACM; this was confirmed by an industrial hygienist. (ORPS Report OH-FN-FDF-FEMP-1997-0054)

- Weekly Summary 96-43 reported that maintenance workers at the Los Alamos National Laboratory discovered nonfriable asbestos while they were removing filter media from a cooling tower. They had removed 97 percent of the media and were not wearing appropriate personal protective equipment. A survey conducted in 1993 identified asbestos inside the cooling tower water separators, and the cooling tower was labeled, “Danger, Contains Asbestos Fibers; Avoid Creating Dust; Cancer and Lung Disease Hazard.” However, the label had deteriorated and fallen off. Investigators determined that survey information had not been forwarded to the facility manager, so no one knew of the hazard before starting the work. (ORPS Report ALO-LA-LANL-ADOADMIN-1996-0006)

This event illustrates the importance of knowing where asbestos and other hazardous materials such as man-made fibers (fibrous glass, mineral wool, ceramic fibers) are used in a facility. In the Pantex event, the insulation was labeled as containing asbestos but the craft person assumed it did not contain asbestos because the insulation on the other pump did not. Even if the insulation was not labeled, it would have been safer for the craft personnel to have assumed that the insulation contained asbestos before they disturbed it. Facility managers should ensure that personnel are aware of the hazards associated with ACM and its location in the workplace.

Asbestos is a fibrous mineral that was used in insulation products until the early 1970s. OSHA Fact Sheet 93-06, *Better Protection Against Asbestos in the Workplace*, states that exposure to asbestos can cause asbestosis (scarring of the lungs resulting in loss of lung function that progresses to disability and death); mesothelioma (cancer affecting the membranes lining the lungs and abdomen); lung cancer; and cancers of the esophagus, stomach, colon, and rectum. Symptoms of asbestos-related diseases may not appear for 20 years or more after initial exposure. Asbestos products can be found in insulation used on piping systems and tanks, ceiling tiles, and other construction materials. During work involving friable ACMs, approved respirators, protective clothing, and personal air monitoring should be required. Locations where loose friable asbestos is present should be posted with warning signs that call for respirators and protective clothing. Exposure to asbestos should be maintained as low as reasonably achievable and within the exposure limits established by OSHA and the Asbestos Hazard and Emergency Response Act.

DOE 421.3, *Nuclear Safety Analysis Reports*, and DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE O 5480.23, Nuclear Safety Analysis Reports*, provide guidance for protecting personnel from hazardous materials. Hazardous materials are those that can adversely impact the health and safety of the public or pose a risk to workers.

OSHA pamphlet 3095, *Asbestos Standard for General Industry*, provides guidance for monitoring exposures, regulating areas, and controlling asbestos. Employers must establish regulated areas wherever airborne concentrations of asbestos or presumed ACM exceed the permissible exposure limit of 0.1 fiber/cc of air as averaged over an 8-hour, time-weighted average day. Warning signs must be provided and displayed at each regulated area. Where engineering and work practice controls are insufficient to reduce exposure to the permissible level, the employer must supplement them with respiratory protection. Copies of the OSHA pamphlet can be obtained at http://www.osha-slc.gov/Publications/Osha3095.pdf. OSHA also offers a software program called Asbestos Advisor 2.0, which is an interactive compliance assistance tool. It produces guidance on how the asbestos standard may apply to the user's buildings and work tasks based on the user's response to questions in the program. Information on this program can be found at http://www.osha.gov/oshasoft/asbestos.

KEYWORDS: asbestos, insulation, industrial hygiene, mechanical maintenance, sampling

FUNCTIONAL AREAS: Industrial Safety, Mechanical Maintenance

4. SLUDGE COLLECTOR FALLS INTO CELL

On February 18, 1999, at the Savannah River Laboratory Technical Area, a sludge collector containing a 25-liter sample of radioactive wastewater fell from its transfer cask as workers were attempting to lower it into a cell. The 150-pound sludge collector fell through an open access plug in a cell roof mezzanine and approximately 15 feet into a waste box when a winch cable failed. The accident did not result in personnel injury, damage to the cell or the sludge collector, or release of contamination. Nevertheless, it compromised personnel and facility safety because the sludge collector, filled with high-activity waste, could have dropped into an occupied work area, causing personnel injury, elevated radiation exposure, or equipment damage. (ORPS Report SR--WSRC-LTA-1999-0007)

The sludge collector is used to collect samples from high-activity waste tanks at the H-Area Tank Farm. It is shipped to the Laboratory Technical Area for analysis in an inverted, 8-ton shielded cask that is modified with a 12-V winch to raise and lower the collector. The winch cable is plastic-jacketed 1/8-inch stainless steel wire. The sludge collector is a canister fitted with an upper extension and a hydraulic operator for the sampling mechanism. It is attached to the winch cable by means of a removable coupling and lifting eye pinned to the upper extension.

After the sludge collector fell into the cell, workers returned the transport cask to its base plate and reinstalled the cell access plug. The project manager suspended work on the cask and the cell. Because the sampling task involved both the H-Area Tank Farm and the Laboratory Technical Area, the manager of each facility held a critique of the occurrence and initiated an investigation. Investigators identified the following sequence of events.

- In December 1998, the Laboratory Technical Area requested a supernate sample from a particular H-Area Tank Farm waste pretreatment tank. Samples normally are taken from the sludge bottoms, but this sample was to be taken from the fluid volume of the tank. H-Area Tank Farm managers developed a schedule for the sampling evolution.

- **February 2 through 8, 1999, Laboratory Technical Area** — While they were preparing the sludge collector and cask for the sampling task, technicians were not able to lower the empty sludge collector assembly from the transfer cask. They removed the winch cover and discovered that the plastic jacket on the cable was broken and frayed. Maintenance personnel installed a new cable and technicians lowered the sludge collector into a cell to install a coupling. After technicians had installed the coupling and a shackle, they determined that the combined length of the shackle and lifting hook would not allow the sludge collector to be raised far enough into the cask. Riggers therefore removed the shackle and lifting hook and installed the cable directly through the eye of the coupling, using two cable clamps. They did not strip the plastic from the cable before installing the clamps, which disregards the cable manufacturer's warnings. Technicians then raised the sludge collector into the cask and shipped the cask to the H-Area Tank Farm.

- **February 9 through 12, 1999, H-Area Tank Farm** — Technicians removed a plug from the tank to be sampled, installed temporary lead shielding around the opening, and attached hydraulic fluid operating lines to the sludge collector. As the sludge collector was lowered into the tank, the hydraulic lines, which are made of rigid Teflon and are difficult to coil, strained and broke. Technicians had to raise the sludge collector to replace the lines. This added element caused a one-hour delay and required an increase in the permissible radiation doses for the task. After maintenance personnel had replaced the hydraulic lines, technicians were able to obtain the sample and shipped the loaded cask back to the Laboratory Technical Area.

- **February 18, 1999, Laboratory Technical Area** — Personnel removed the plug from the cell, removed the base plate from the transfer cask, and positioned the cask over the cell access opening. When they tried to lower the sludge collector using the winch, it stopped after traveling approximately 5 inches. After three attempts to lower the sludge collector, they notified the area supervisor, who directed them to try to raise it back into the cask. As they did so, the cable failed and the sludge collector and coupling fell into the cell. Subsequent examination revealed that the cable was tangled and jammed in the winch drum and that the cable wire had slipped through its plastic jacket at the cable clamps.

Other concerns identified by investigators include the following.

- Work planners did not address fall protection around the openings created by the task and did not address the need for hard hats. They did not include safety requirements in the work clearance permit, nor did they address the potential for increased radiation exposure created by using sludge-collecting equipment and handling tools to collect a supernatant sample. Finally, work planners did not address the possible failure of the winch cable.

- H-Area Tank Farm managers approved and issued the procedure for sampling at 1600 on the day the evolution began.

- Sampling equipment design contributed substantially to the occurrence. Design deficiencies include failure of the winch to spool cable evenly, excessive damage to the cable jacket by the winch, and rigid hydraulic lines with no provision for spooling them to prevent fouling. In addition, plastic-jacketed cable tends to twist and snarl as load is applied and released.

- Riggers modified the cable attachment to the coupling without adequately reviewing and analyzing the potential consequences.

- Radiological control personnel at the H-Area Tank Farm did not identify low-exposure areas for workers obtaining the sample, nor did they plan for the possibility that a sample might be dropped on top of the tank. Although total man-rem would not have changed, using different crews to remove the plug from the tank and to install the temporary shielding around the opening would have reduced individual exposures.

This occurrence underscores the importance of performing a thorough activity hazard analysis for all jobs, especially those that are new activities or those that have been changed. It also underscores the importance of adequate control of the design, modification, and maintenance of systems and equipment important to safety. Managers should ensure that work hazards are systematically identified and incorporated into hazard analyses, work permits, procedures, and other work-planning documents.

DOE-STD-1120-98, *Integration of Environment, Safety, and Health into Facility Disposition Activities*, provides guidance for enhancing worker, public, and environmental safety. This standard supports integrated safety management system principles to guide the safe accomplishment of work activities. These principles include (1) line management responsibility for safety, (2) clear roles and responsibilities, (3) competence commensurate with responsibilities, (4) balanced priorities, (5) identification of safety standards and requirements, (6) hazard controls tailored to work being performed, and (7) operations authorization. DOE/EH-256T, *Radiological Control Manual*, Part 1, “Planning Radiological Work,” states that technical requirements for the conduct of work, including construction, modification, operation, maintenance, and decommissioning, shall incorporate radiological criteria to ensure safety and maintain radiation exposures as low as reasonably achievable.

While it is appropriate to exclude certain routine work from formal control, supervisors should recognize that temporary changes to permanent engineered systems require work controls commensurate with the potential hazards. DOE O 4330.4B, *Maintenance Management Program*, chapter 6, “Maintenance Procedures,” identifies maintenance procedures and other work-related documents needed to provide appropriate work direction and ensure that maintenance is performed safely and efficiently. Chapter 8, “Control of Maintenance Activities,” states that a work control program establishes the requirements for identifying, planning, approving, and conducting maintenance activities. The Order provides a definition of maintenance management and describes the types of work that should be controlled. DOE-STD-1053-93, *Guideline to Good Practices for Control of Maintenance Activities at DOE Nuclear Facilities*, provides extensive guidance for the development of work control plans and the supervision of maintenance activities.

KEYWORDS: design, industrial safety, job-hazard analysis, maintenance, modification

FUNCTIONAL AREAS: Design, Mechanical Maintenance, Industrial Safety

FINAL REPORT

This section of the OEWS discusses events filed as final reports in the ORPS. These events contain new or additional lessons learned that may be of interest to personnel within the DOE complex.

1. 480-V CABLE SEVERED

On September 30, 1998, at the Portsmouth Environmental Restoration Facility, a backhoe operator struck and severed an energized 480-V cable while he was excavating to repair a broken water line. A circuit breaker tripped and interrupted the ground fault caused by the excavation. The job supervisor stopped work immediately and site managers issued a stop-work order for all excavating activities pending a complete investigation. Electricians identified and locked out the affected breaker. Although this occurrence did not cause injuries, disturbing underground utilities reduces safety margins and can interrupt vital services. (ORPS Report ORO--BJC-PORTENVRES-1998-0017)

Investigators determined that job planners had identified and marked utilities in the excavation area using as-built drawings, had surveyed the area using subsurface detection equipment, and had satisfied all engineering and administrative requirements for the excavation. They identified a mistake in equipment or material selection as the direct cause of the occurrence: the subsurface detection equipment may not have been adequate to detect all utilities in all cases. Investigators also identified a mistake in drawings, specifications, or data as the root cause for the occurrence: the cable run was not shown on the site's as-built drawings. Because many past modifications and changes have not been incorporated into these drawings, they should used only for reference.

As the corrective action for this occurrence, facility personnel performed an engineering evaluation of subsurface utility detection instruments to select a type that will provide more reliable indication.

NFS reviewed a recent similar occurrence at the Savannah River Environmental Restoration Operations Facility. On January 28, 1999, construction personnel struck a buried electrical box that was not identified on existing controlled drawings. Investigating engineers discovered that the box contained coiled 480-V ac lines for future pump installations and that the cables originated at a motor control center. Although the fuse receptacles for the cables were empty and the associated switch was open, no lockout had been applied. Construction personnel had identified and marked 23 underground obstructions over the half-mile route using controlled drawings, but the drawings did not show the installation. Workers had surveyed the area above the box three times with ground-penetrating radar but did not detect the box. (ORPS Report SR--WSRC-ERF-1999-0003)

Utility lines and cables have been buried on DOE property since the 1940s. Many of them are undocumented or poorly documented. DOE prime contractors and subcontractors, and personnel within these organizations, have turned over many times, diluting the memory of past operations. Up to the present day, the task of integrating existing documentation into accurate as-built drawings has been impeded by limited resources. The general uncertainties surrounding the existence and precise locations of underground utilities demand special planning and execution of excavations. After buried utilities are identified using the best available drawings, their exact locations should be determined and marked in the field using an appropriate combination of radar, magnetic, and sonic detectors. Construction managers and supervisors should also consider the following recommendations.

- Use more than one method of underground utilities detection. Under some conditions, one method may locate an obstacle when another will not.

- Repeat surveys for obstacles at successive depths during excavation.

- Evaluate the condition and technology generation of existing equipment. If possible, obtain the latest versions.

- Provide detection equipment operators with factory-sponsored training and retraining on new or existing equipment. Considerable skill is needed to use underground utilities detection equipment effectively.

DOE/EH-0541, Safety Notice 96-06, *Underground Utilities Detection and Excavation,* provides additional descriptions of excavation events. It describes technology for underground utility detection, specific recommendations for improving excavating programs, and innovative practices used at DOE facilities. The notice states that a central coordinator should not only assist in identifying underground utilities but should also record the findings. The safety notice cites three principal causes of excavation and digging occurrences: failure to detect underground utilities because of reliance on as-built drawings, failure to use hand-digging because of the pressure of schedules, and failure to detect underground utilities because detection devices were not used or were used ineffectively. Safety Notice 96-06 can be obtained by contacting the ES&H Information Center, (800) 473-4375, or by writing to U.S. Department of Energy, ES&H Information Center, EH-72, 19901 Germantown Rd., Germantown, MD 20874. Safety notices are also available on the OEAF home page at http://tis.eh.doe.gov:80/web/oeaf/lessons_learned/ons/ons.html.

Other sources for excavation safety information include the following.

- Hanford Lessons Learned No. 1998-RL-HNF-0026, available at http//www.hanford.gov/lessons/sitell/1998/199826.htm. This document provides the lessons learned from two excavation occurrences at Hanford and describes the bases for the Hanford excavation safety program.

- The OSHA technical link for trenching and excavation, available at http://www.osha-slc.gov/SLTC/trenchingexcavation/index.html.

KEYWORDS: cable, excavation, industrial safety, underground, utility

FUNCTIONAL AREAS: Construction, Industrial Safety

OEAF FOLLOW-UP ACTIVITY

1. PRESSURIZED DRUM LID RELEASE

On March 4, 1999, at the Portsmouth Gaseous Diffusion Plant, waste handlers were removing the retaining rings from 55-gal waste drums to verify the contents of the drums. As they loosened the ring on the eighth drum to be opened, the lid blew off, traveled approximately 10 feet into the air, and landed 8 feet away. No drum-opening precautions had been taken because this drum and the other drums opened showed no signs of pressurization. Investigators determined that a coating inside the drum, which was a sign that the drum had been previously used, had not been removed or neutralized. They believe the coating reacted with the steel drum walls and may have liberated gases that pressurized the drum. This event is significant because pressurized drums can cause significant personnel injury from the release of drum pressure or contents. (ORPS Report ORO--BJC-PORTENVRES-1999-0004)

Numerous pressurized drum events have been reported across the DOE. Weekly Summary 99-08 examines pressurized drum events and provides safety precautions and information for drum users about how to approach, handle, and open all closed drums. A drum may or may not show visible signs of pressurization (e.g., bulging). A video titled “Bulging Drums - What Every Responder Should Know” is available to help educate waste workers, hazardous materials teams, fire fighters, etc. Copies of the video can be obtained by contacting Michael Larranaga at the Los Alamos National Laboratory, by phone at (505) 665-9396 or e-mail at larranaga@lanl.gov. Research data that document the failure mechanisms of different sized pressurized drums are in Lessons Learned 1999-LA-LANL-ESH7-0004, which can be found at http://tis.eh.doe.gov/oeaf/ll.html.

KEYWORDS: pressurized drum, safety

FUNCTIONAL AREAS: Industrial Safety, Materials Handling/Storage

2. CORRECTION TO WEEKLY SUMMARY 99-08, ARTICLE 5

The article incorrectly referred to Bechtel-Jacobs managers at the Rocky Flats Environmental Technology Site. Instead it should have referred to Jacobs Engineering managers who are at the site as a part of Rocky Flats Closure Site Services.